Cell Stem Cell

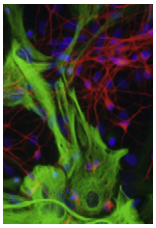
Editors' Notes

An Intervention on Therapy

Much discussed of late has been the concept of "stem cell tourism," or the growing trend of patients leaving their home environment to seek stem cell treatments in other locales, which are often provided at great expense and are suspected by many to be lacking in scientific support for both safety and efficacy. In an attempt to curtail misrepresentation of putative stem cell therapies to potential clients, an international ISSCR task force has developed Clinical Guidelines for stem-cell-based treatments. These guidelines are summarized in an accompanying Commentary article in the ISSCR section of this issue. The proposed standards may not be binding, but the task force's efforts offer an invaluable resource to institutions working to develop clinical applications of stem cells, as well as to patients who seek to evaluate potential intervention options available to them. In addition, a Correspondence article from Caulfield and colleagues assesses the portrayal of stem cell applications offered by a host of commercial operations, as described on their company websites. The content analysis of these sites, as compared to available peer-reviewed published scientific literature, reveals that by and large the websites offer an overly optimistic view of the efficacy of their wares.

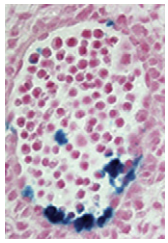
Dishing Disease Models

Determining the origin and pathogenesis of complex human ailments is exceedingly challenging, and deconstructed disease models can offer insight by taking a reductionist approach. In this issue, two independent studies from the Gage and Eggan laboratories reveal that hESC-derived motor neurons are highly and specifically susceptible to killing by neighboring astrocytes that harbor an ALS-causing mutation of the SOD1 gene. Both groups use their respective in vitro systems to identify soluble mediators of the astrocyte-dealt death, including superoxide and prostaglandin. In another research article, Ratner and colleagues reveal that EGF receptor expression marks a population of human and mouse neurofibromal cells that exhibit tumorigenic potential. These Schwann cell tumors are typical of patients with neurofibromatosis type 1, and thus the model system may help identify and test signaling pathways that can be targeted to develop potential disease treatments.



Blood Crossing Boundaries

Two articles in this issue reveal interesting aspects of HSCs that connect them to nonhematopoietic systems. Trumpp and colleagues generated HSCs that do not express either N-myc or c-myc. Proliferation and self-renewal of the mutant HSCs are altered during steady-state conditions, and this population also exhibits a specific reduction in survival. The cells accumulate cytoplasmic Granzyme B, previously only observed in cytotoxic, differentiated immune lineages. The embryonic origin of primitive blood precursors has been open to some question and debate within the hematopoietic field. Recent technical advances that have helped to clarify this issue are discussed in the Minireview from Yoder and colleagues, including a research article in this issue from the Iruela-Arispe laboratory. In their study, the authors use lineage tracing to reveal that specific regions of the embryonic endothelium not only support hematopoietic progeny, but also give rise to early HSCs. This direct connection of hematopoietic and endothelial lineages in vivo offers a striking advance in the understanding of blood cell development.



Pluripotency for Everyone

The attraction of using direct reprogramming methods to generate pluripotent cells from somatic tissues is largely attributed to the potential of iPSCs in both clinical and basic research applications, as well as to the fact that direct reprogramming overcomes many practical and ethical limitations of other pluripotent techniques. However, the procedures required to induce pluripotency using defined factors require a specific skill set and a certain degree of expertise. In their Protocol Review, Maherali and Hochedlinger not only offer readers a summary of the current requirements for inducing pluripotency in somatic cells, but also outline and compare the various approaches used by different laboratories across the world. The authors also comment on the range of assays used to assess the pluripotency of resulting cell lines and offer some suggestions as to the minimal criteria that can be used to verify successful reprogramming. Also in this issue, Deng and colleagues describe the isolation of iPSCs from monkey cells, demonstrating that the same reprogramming factors that work for mouse and human cells are also sufficient to induce pluripotency in another species.